

Multiple Choice.

B 1. Which number is not a solution of the inequality $-27 \leq 3(1-2x) \leq 3$?

- a. 4 b. -1 c. $\frac{1}{2}$ d. 0

$$\begin{aligned} -27 &\leq 3 - 6x \leq 3 \\ -30 &\leq -6x \leq 0 \\ 5 &\geq x \geq 0 \end{aligned}$$

D 2. Which number is not a solution of the equation $|x+5| = x+5$?

a. 5 b. 0 c. -5 d. -10

$$\begin{aligned} |5+5| &= 5+5 & |0+5| &= 0+5 & |-5+5| &= -5+5 & |-10+5| &= -10+5 \\ 10 &= 10 \checkmark & 5 &= 5 \checkmark & 0 &= 0 \checkmark & 5 &\neq -5 \end{aligned}$$

A 3. Which of the following equations have more than one solution?

I. $|x-3| = 4$ $x-3=4 \rightarrow x=7$ $x-3=-4 \rightarrow x=-1$

II. $2(x+\frac{1}{2}) = 2x+1 \rightarrow 2x+1 = 2x+1 \rightarrow 1=1 \text{ IR}$

III. $|x+2| = -1 \rightarrow \text{No Sol. (Abs val} \neq \text{a neg.)}$

IV. $3x+5=14 \rightarrow x=3$

- a. I and II only b. I and III only c. II and III only d. I, II, III, and IV

Solve. Be sure to show all solutions.

4. $5 - 2(3x+2) = 2(-3x+1) + 1$

$$\begin{aligned} 5 - 6x - 4 &= -6x + 2 + 1 \\ -6x + 1 &= -6x + 3 \\ 1 &\neq 3 \end{aligned}$$

No solution

5. $\frac{a+4}{4} + \frac{2a}{3} = \frac{12}{1}$

$$12 \left(\frac{3a+12}{12} + \frac{8a}{12} = \frac{144}{12} \right) 12$$

$$3a+12+8a=144$$

$$11a+12=144$$

$$11a=132$$

$$a=12$$

6. $\frac{x+6}{2} + \frac{x-7}{5} = \frac{3}{1}$

$$10 \left(\frac{5x+30}{10} + \frac{2x-14}{10} = \frac{30}{10} \right) 10$$

$$5x+30+2x-14=30$$

$$7x+16=30$$

$$7x=14$$

$$x=2$$

Solve.

7. The total length of three strings is 26 inches. The first string is twice the length of the second. The third string is one-fourth the length of the second. Find the lengths of the three strings.

Define the variable(s)

Write and Solve an Equation

Answer the question

x = length of 2nd string

$2x$ = length of 1st string

$\frac{1}{4}x$ = length of 3rd string

$$x + 2x + \frac{1}{4}x = 26$$

$$3.25x = 26$$

$$x = 8$$

$$x = 8 \text{ in (2nd string)}$$

$$2x = 16 \text{ in (1st string)}$$

$$\frac{1}{4}x = 2 \text{ in (3rd string)}$$

8. The length of a rectangle is 5 cm greater than its width. The perimeter is 106 cm. Find the dimensions of the rectangle.

Define the variable(s)

Write and Solve an Equation

Answer the question

$$\text{width} = w$$

$$\text{length} = w + 5$$

$$w + w + 5 + w + w + 5 = 106$$

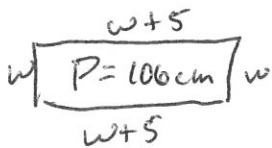
$$4w + 10 = 106$$

$$4w = 96$$

$$w = 24$$

$$w = 24 \text{ cm (width)}$$

$$w + 5 = 29 \text{ cm (length)}$$



9. The sides of a triangle are in the ratio 3:4:6. What is the length of each side if the perimeter is 104 cm?

Define the variable(s)

Write and Solve an Equation

Answer the question

$$3x = 1^{\text{st}} \text{ side}$$

$$4x = 2^{\text{nd}} \text{ side}$$

$$6x = 3^{\text{rd}} \text{ side}$$

$$3x + 4x + 6x = 104$$

$$13x = 104$$

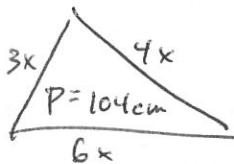
$$x = 8$$

~~2000~~

$$3x = 24 \text{ cm (1st side)}$$

$$4x = 32 \text{ cm (2nd side)}$$

$$6x = 48 \text{ cm (3rd side)}$$



10. Find 3 consecutive odd integers such twice the sum of the first and third integers is twenty-one more than the second integer.

Define the variable(s)

Write and Solve an Equation

Answer the question

$$x = 1^{\text{st}} \text{ odd integer}$$

$$x+2 = 2^{\text{nd}} \text{ odd integer}$$

$$x+4 = 3^{\text{rd}} \text{ odd integer}$$

$$2(1^{\text{st}} + 3^{\text{rd}}) = 2^{\text{nd}} + 21$$

$$2(x + x + 4) = x + 2 + 21$$

$$2(2x + 4) = x + 23$$

$$4x + 8 = x + 23$$

$$3x + 8 = 23$$

$$3x = 15$$

$$x = 5$$

$$x = 5 \text{ (1st odd)}$$

$$x+2 = 7 \text{ (2nd odd)}$$

$$x+4 = 9 \text{ (3rd odd)}$$

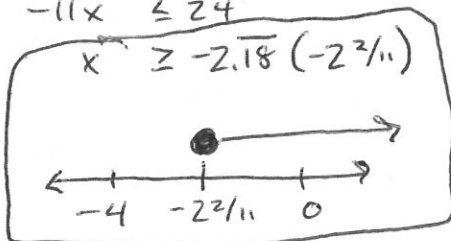
Solve and graph each inequality.

11. $4x - 2 \leq 15x + 22$

$$-11x - 2 \leq 22$$

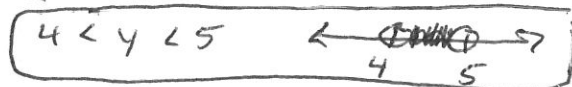
$$-11x \leq 24$$

$$x \geq -2.18 \quad (-2 \frac{2}{11})$$



12. $9 < 1 + 2y \leq 11$

$$\frac{8}{2} < \frac{2y}{2} < \frac{10}{2}$$



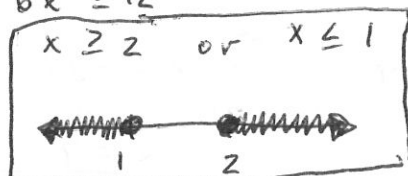
13. $6(x+2) \geq 24$ or $5x+10 \leq 15$

$$6x + 12 \geq 24$$

$$5x \leq 5$$

$$6x \geq 12$$

$$x \geq 2 \text{ or } x \leq 1$$

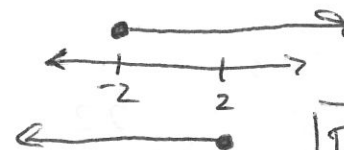


14. $5x+12 \geq 2$ or $7x-1 \leq 13$

$$5x \geq -10$$

$$7x \leq 14$$

$$x \geq -2 \text{ or } x \leq 2$$



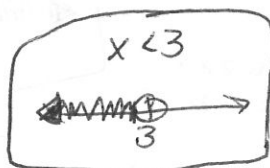
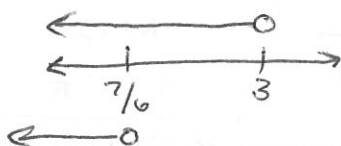
\mathbb{R} = All Real Solutions

15. $6x-2 < 5$ or $7x-5 < 16$

$$6x < 7$$

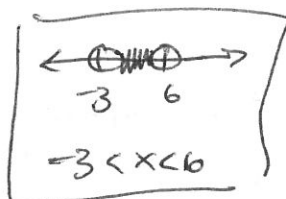
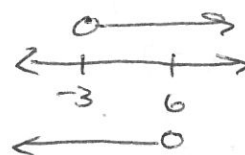
$$7x < 21$$

$$x < 7/6 \text{ or } x < 3$$



16. $9x < 54$ and $-4x < 12$

$$x < 6 \text{ and } x > -3$$

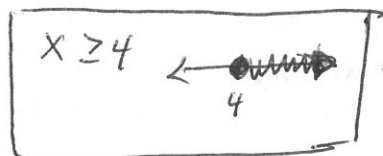
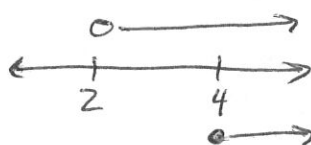


17. $2x-3 \geq 5$ and $3x-1 > 5$

$$2x \geq 8$$

$$3x > 6$$

$$x \geq 4 \text{ and } x > 2$$



18. $10x+2 \leq 2x-14$ and $9x-12 > 5x$

$$8x+2 \leq -14$$

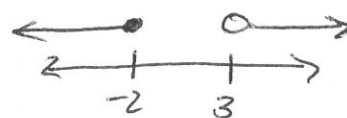
$$-12 > -9x$$

$$8x \leq -16$$

$$3 < x$$

$$x \leq -2$$

$$x > 3$$



No Solution

Solve. Be sure to show all solutions. Check for extraneous solutions.

19. $|x+4|=8$

$x+4=8$ $x+4=-8$

$x=4$ $x=-12$

$|4+4|=8$ $|-12+4|=8$

$|8|=8$ $|-8|=8$

$8=8\checkmark$ $8=8\checkmark$

Isolate
1st!

20. $2|x-3|+4=-16$

$2|x-3|=-20$

$|x-3|=-10$

or

$x-3=-10$ $x-3=10$

$x=-7$ ext. sol. $x=13$ ext. sol.

$2|-7-3|+4=-16$ $2|13-3|+4=-16$

$2|-10|+4=-16$ $2|10|+4=-16$

$20+4\neq-16$ $20+4\neq-16$

No Solution
Abs Value cannot equal a neg. #

21. $2|5x+3|=16$

$|5x+3|=8$

$5x+3=8$ $5x+3=-8$

$5x=5$ $5x=-11$

$x=1$ $x=-2.2$

$2|5(1)+3|=16$ $2|5(-2.2)+3|=16$

$2|5+3|=16$ $2|-11+3|=16$

$2|8|=16$ $2|-8|=16$

$2(8)=16\checkmark$ $2(-8)=16\checkmark$

22. $|x-3|=2x-4$

$x-3=2x-4$ $x-3=-2x+4$

$-3=x-4$ $3x-3=4$

$1=x$ $3x=7$

ext. sol. $x=7/3$

$|1-3|=2(1)-4$ $|7/3-3|=2(7/3)-4$

$|-2|=2-4$ $|-2/3|=14/3-4$

$2\neq-2$ $2/3\neq 2/3\checkmark$

Solve and graph each inequality.

23. $|8x-4|\leq 20$

$8x-4=20$ $8x-4=-20$

$8x=24$ $8x=-16$

$x=3$ $x=-2$

I $|8(-3)-4|\leq 20$

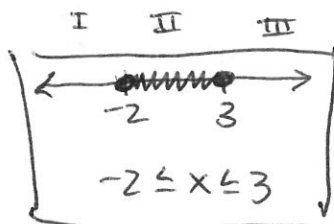
$28\leq 20$ F

II $|8(0)-4|\leq 20$

$4\leq 20$ T

III $|8(4)-4|\leq 20$

$28\leq 20$ F



24. $|2x|-6>20$

$2x=26$ $2x=-26$

$x=13$ $x=-13$

I $|2(-14)|-6>20$

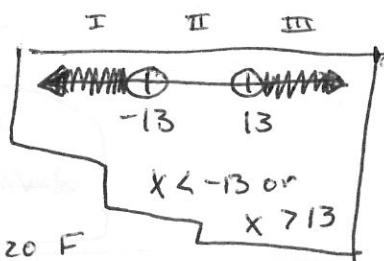
$22>20$ T

II $|2(0)|-6>20$

$-6>20$ F

III $|2(14)|-6>20$

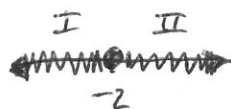
$22>20$ T



25. $|x+2|\geq 0$

$x+2=0$

$x=-2$



I $|-3+2|\geq 0$

$1\geq 0$ T

II $|-1+2|\geq 0$

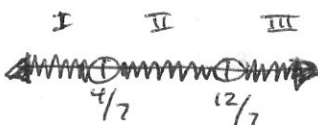
$1\geq 0$ T

26. $-3|7x-8|<12$

$|7x-8|>-4$

$7x-8=-4$ $7x-8=4$

$x=4/7$ $x=12/7$



I $-3|7(0)-8|<12$

$-24<12$ T

II $-3|7(1)-8|<12$

$-3<12$ T

III $-3|7(2)-8|<12$

$-18<12$ T